

PATENT COOPERATION TREATY

REC'D 23 JUN 2006

WIPO

PCT

PCT

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/B2005/003127

International filing date (day/month/year)
20.10.2005

Priority date (day/month/year)
21.10.2004

International Patent Classification (IPC) or both national classification and IPC
INV. H02M7/48

Applicant
NISSAN MOTOR CO., LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl
Fax: +31 70 340 - 3016

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Imbernon, L

Telephone No. +31 70 340-2507



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/003127

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/003127

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-18
Inventive step (IS)	Yes: Claims	
	No: Claims	1-18
Industrial applicability (IA)	Yes: Claims	1-18
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43bis.1 and 70.10)

and /or

2. Non-written disclosures (Rules 43bis.1 and 70.9)

see form 210

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following documents:
D1: US-A-4 443 841 (MIKAMI ET AL) 17 April 1984 (1984-04-17)
D2: US-A-6 031 738 (LIPO ET AL) 29 February 2000 (2000-02-29)
2. Clarity and Conciseness Objections
This application suffers major clarity issues under Article 6 PCT.
 - 2.1. The application does not comply with the provision of Rule 6.1(a) PCT, because independent claims 1, 5 and 9 lack conciseness. Although claims 1, 5 and 9 have been drafted as separate independent method claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought. These claims are therefore unduly multiplied and obscure the definition of the claimed invention, see guidelines PCT, Annex to Chapter 5, A5.42(1).
 - 2.2. The terms "determining conductivity of a switch" used in claims 1, 5, 9, and "performs conductance of the switch" in claim 13 are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer. It is not clear whether these terms refer really to the electrical conductivity of the switch path measured in $S.m^{-1}$ and its inverse the conductance variable, or as it appears from the drawings merely intend to cover the step of switching ON of said switch. These terms thereby render the definition of the subject-matter of said claims unclear, Article 6 PCT.
 - 2.3. The terms "voltage command" used in claims 1, 5, 9, and 13 are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer. These terms are nowhere defined in said claims and thereby render the definition of the subject-matter of said claims unclear, Article 6 PCT.
 - 2.4. The terms "carriers" used in claims 5 and 9 are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer. These terms are

no where defined in said claims and thereby render the definition of the subject-matter of said claims unclear, Article 6 PCT.

- 2.5. It is not clear right now what are the minimum essential features for the definition of the invention but from the description on page 3, fourth paragraph- page 4, first paragraph at least the following features appear to be essential :
- a) the method is for a power converter powering a three-phase Ac motor and comprises three modes of operation, where "the motor can be driven using the two power sources simultaneously or using only one of them", (the subject-matter of claims 1, 5, 9 and 13 does not clearly claim these three different cases of operation A, B and C of figure 6 and of pages 6 and 7 of the description. It seems especially that case C is missing from claimed subject-matter.)
 - b) these modes of operations depend on the comparison of two triangular waves as defined in claims 2 and 3 with a voltage command signal as defined in the paragraph on page 4 entitled "motor controller and Power distribution controller"

Since none of the independent claims contain these features they do not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

- 2.6. It is further noted that the current wordings of claims 1, 5 and 9 are furthermore conflicting concerning the criteria used to determine whether the power converter is functioning in the mode A (when only the first Dc power source is used) or B (when only the second Dc power source is used). In Claims 1 and 13, the voltage command is compared to the DC power source levels E1 and E2, whereas in claims 5 and 9 the voltage command is compared to the carriers.

The first option appears to lack support in the sens of Article 6 PCT, since there appears to be no support for such teaching in the description nor in the drawings. Besides the conflicting criteria further lead to a lack of clarity as a whole of said claims.

3. Novelty

Given the major problems of clarity raised above, the present application appears not to meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-18 does

not appear to be new in the sense of Article 33(2) PCT over the document D1, when not taking into account the unclear terms and expressions of said claims.

- 3.1. The document D1 discloses (the references in parentheses applying to this document) 13. A power converter, comprising:
- a first DC power source (20);
 - a second DC power source (22);
 - a common bus line (O) connected to a positive pole of the first DC power source and to a negative pole of the second DC power source;
 - a first plurality of semiconductor switches (32) connected between a negative pole of the first DC power source and each of three terminals of a three-phase load;
 - a second plurality of semiconductor switches (38) connected between the common bus line and each of the three terminals of the three-phase load;
 - a third plurality of semiconductor switches (26) connected between a positive bus line of the second DC power source and each of the three terminals of the three-phase load; and
 - a switch control portion that performs the switching of the switch between the positive and negative poles of the first DC power source and between the positive and negative poles of the second DC power source (see figure 5a Vu-o being a three level waveform).
- 3.2. The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding independent method claims 1, 5 and 9, which therefore are also considered not new given the major lack of clarity of said claims.
- 3.3. Dependent claim 2-4, 6-8, 10-12, 14-18 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, see documents D1 and D2 and the corresponding passages cited in the search report.

PATENT COOPERATION TREATY

REC'D 23 JUN 2006

WIPO

PCT

PCT

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/B2005/003127

International filing date (day/month/year)
20.10.2005

Priority date (day/month/year)
21.10.2004

International Patent Classification (IPC) or both national classification and IPC
INV. H02M7/48

Applicant
NISSAN MOTOR CO., LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1 (a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl
Fax: +31 70 340 - 3016

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Imbernon, L

Telephone No. +31 70 340-2507



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/003127

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material:

- ☐ a sequence listing
- ☐ table(s) related to the sequence listing

b. format of material:

- ☐ on paper
- ☐ in electronic form

c. time of filing/furnishing:

- ☐ contained in the international application as filed.
- ☐ filed together with the international application in electronic form.
- ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/003127

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-18
Inventive step (IS)	Yes: Claims	
	No: Claims	1-18
Industrial applicability (IA)	Yes: Claims	1-18
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43bis.1 and 70.10)

and /or

2. Non-written disclosures (Rules 43bis.1 and 70.9)

see form 210

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following documents:
D1: US-A-4 443 841 (MIKAMI ET AL) 17 April 1984 (1984-04-17)
D2: US-A-6 031 738 (LIPO ET AL) 29 February 2000 (2000-02-29)
2. Clarity and Conciseness Objections
This application suffers major clarity issues under Article 6 PCT.
 - 2.1. The application does not comply with the provision of Rule 6.1(a) PCT, because independent claims 1, 5 and 9 lack conciseness. Although claims 1, 5 and 9 have been drafted as separate independent method claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought. These claims are therefore unduly multiplied and obscure the definition of the claimed invention, see guidelines PCT, Annex to Chapter 5, A5.42(1).
 - 2.2. The terms "determining conductivity of a switch" used in claims 1, 5, 9, and "performs conductance of the switch" in claim 13 are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer. It is not clear whether these terms refer really to the electrical conductivity of the switch path measured in $S.m^{-1}$ and its inverse the conductance variable, or as it appears from the drawings merely intend to cover the step of switching ON of said switch. These terms thereby render the definition of the subject-matter of said claims unclear, Article 6 PCT.
 - 2.3. The terms "voltage command" used in claims 1, 5, 9, and 13 are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer. These terms are nowhere defined in said claims and thereby render the definition of the subject-matter of said claims unclear, Article 6 PCT.
 - 2.4. The terms "carriers" used in claims 5 and 9 are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer. These terms are

no where defined in said claims and thereby render the definition of the subject-matter of said claims unclear, Article 6 PCT.

- 2.5. It is not clear right now what are the minimum essential features for the definition of the invention but from the description on page 3, fourth paragraph- page 4, first paragraph at least the following features appear to be essential :
- a) the method is for a power converter powering a three-phase Ac motor and comprises three modes of operation, where "the motor can be driven using the two power sources simultaneously or using only one of them", (the subject-matter of claims 1, 5, 9 and 13 does not clearly claim these three different cases of operation A, B and C of figure 6 and of pages 6 and 7 of the description. It seems, especially that case C is missing from claimed subject-matter.)
 - b) these modes of operations depend on the comparison of two triangular waves as defined in claims 2 and 3 with a voltage command signal as defined in the paragraph on page 4 entitled "motor controller and Power distribution controller"

Since none of the independent claims contain these features they do not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

- 2.6. It is further noted that the current wordings of claims 1, 5 and 9 are furthermore conflicting concerning the criteria used to determine whether the power converter is functioning in the mode A (when only the first Dc power source is used) or B (when only the second Dc power source is used). In Claims 1 and 13, the voltage command is compared to the DC power source levels E1 and E2, whereas in claims 5 and 9 the voltage command is compared to the carriers.

The first option appears to lack support in the sens of Article 6 PCT, since there appears to be no support for such teaching in the description nor in the drawings. Besides the conflicting criteria further lead to a lack of clarity as a whole of said claims.

3. Novelty

Given the major problems of clarity raised above, the present application appears not to meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-18 does

not appear to be new in the sense of Article 33(2) PCT over the document D1, when not taking into account the unclear terms and expressions of said claims.

- 3.1. The document D1 discloses (the references in parentheses applying to this document)13. A power converter, comprising:
- a first DC power source (20);
 - a second DC power source (22);
 - a common bus line (O) connected to a positive pole of the first DC power source and to a negative pole of the second DC power source;
 - a first plurality of semiconductor switches (32) connected between a negative pole of the first DC power source and each of three terminals of a three-phase load;
 - a second plurality of semiconductor switches (38) connected between the common bus line and each of the three terminals of the three-phase load;
 - a third plurality of semiconductor switches (26) connected between a positive bus line of the second DC power source and each of the three terminals of the three-phase load; and
 - a switch control portion that performs the switching of the switch between the positive and negative poles of the first DC power source and between the positive and negative poles of the second DC power source (see figure 5a Vu-o being a three level waveform).
- 3.2. The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding independent method claims 1, 5 and 9, which therefore are also considered not new given the major lack of clarity of said claims.
- 3.3. Dependent claim 2-4, 6-8, 10-12, 14-18 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, see documents D1 and D2 and the corresponding passages cited in the search report.